THE IMPACT OF FOREIGN SHAREHOLDINGS AND ORIGINATING COUNTRIES ON BANKING SECTOR EFFICIENCY

Sok-Gee Chan
Department of Finance and Banking, Faculty of Business and Accountancy,
Universiti of Malaya
50603 Kuala Lumpur

Eric H.Y. Koh
Department of Finance and Banking, Faculty of Business and Accountancy,
Universiti of Malaya
50603 Kuala Lumpur

Corresponding to:
Sok-Gee Chan
Department of Finance and Banking, Faculty of Business and Accountancy,
Universiti of Malaya
50603 Kuala Lumpur
(tel.: +603-79673888 fax: +603-79673980 e-mail: sokgee@um.edu.my)

ABSTRACT

This study analyses the effects of foreign shareholdings on the ASEAN-5 banking sector performance using the Stochastic Frontier Analysis based Battese and Coelli (1995) model. Unlike most extant studies which compared the performance of local and foreign banks, this study assessed how foreign shareholdings of banks in a given country affect its banking sector's performance. It also evaluates the resource-based approach to differentiate the impact of the different origins of the foreign shareholdings. This paper's findings also present public policy implications because foreign shareholdings especially those from the more developed countries contribute positively to bank performance. This study presents three findings. First, foreign shareholding concentration affects bank efficiencies positively. Second, the foreign shareholders' countries of origin matter, but Asian countries had the greatest impact, perhaps a reflection of proximity and familiarity. In sum, foreign shareholdings have contributed positively to bank efficiency by reducing agency costs and enhancing the bank's resource base. Third, excessive regulation worsens banks' profit efficiency.

Keywords:
bank efficiency; foreign shareholdings; resource-based; commercial banks; Stochastic Frontier Analysis; ASEAN 5

JEL Classification: G21; F23; D24; C23

1.0 Introduction

Research on the banking sector's performance is vital for three reasons. First, banks play a pivotal role in mobilizing funds needed for economic growth in both developed and developing economies. Conversely, mismanagement of banks' resources can inflict major damage, as the recent Global Financial Crisis has shown. Second, globalization has facilitated foreign shareholdings of banks but the impact of foreign shareholdings, especially on developing countries, is still unclear as they operated in a highly regulated environment by the local authorities as compared to the developed counterparts. Third, for developing countries, imperfect markets and information asymmetries further affects the banks' performances and allocation of resources in ways not necessarily predicted by extant theories.

A study of the banking sectors' foreign shareholdings in the Association of Southeast Asian Nations (ASEAN), a growing and dynamic grouping, can shed light on the above questions. ASEAN's banking sectors have traditionally been highly regulated. The entry of foreign banks was previously restricted. Nonetheless, ASEAN's banking sectors have begun opening up to foreign shareholdings or even foreign banks as they rode out the Asian Financial Crisis of 1997-99. Some ASEAN banks, like their Chinese counterparts, have actively sought to tap foreign banks' expertise to grow further (Berger, Hasan and Zhou 2009; Li, 2013). More recently, Vietnam has also increased the ownership ceiling for foreign investors so as to strengthen its ailing banking system (*Bloomberg News*, 2014). At the same time, foreign banks are seeking opportunities for more strategic stakes in the light of better growth prospects in Asia/ASEAN (Li, 2013).

For both ASEAN banks and the foreign shareholders, the benefits of partnership, supported by several theories (resource-based theory, agency theory and institutional theory) and empirical studies, must be weighed against the costs, especially those imposed by imperfect markets, information asymmetries and government control. These factors are also germane to any analysis of the factors affecting bank performance. The findings by Wu, Chen and Lin (2007) for Chinese banks during the earlier years of reform (1996-2004) - that banks with foreign shareholdings performed worse than those without - is a cautionary tale of imperfect markets and government restrictions.

This paper aims to analyse how foreign shareholdings affect the banking sectors' performance of five key ASEAN countries', the 'ASEAN-5', which comprises Indonesia, Malaysia, the Philippines, Singapore, and Thailand, from year 2001 to 2012. The study covers the period of post-Asian Financial Crisis which is crucial as most of the commercial banks in this region had undergone major restructuring and consolidation with the injection of both private and foreign funds. Hence, this ensures the validity of the analysis of foreign shareholdings in ASEAN-5. In addition, this study aims to address the contribution of the foreign shareholdings in terms of resource allocation by focusing on the origin of the foreign funds. This is an important contribution of the study as the origin of foreign shareholdings may be a major factor for the banks' allocation of resources due to differences in objectives and technology from the host countries. To the best of our knowledge, there is no published study on the presence of foreign shareholdings based on the country of origin on banks' efficiency levels.

This paper is structured as follows. Section 2 reviews previous work done on how foreign shareholdings affect banking sector performance and identifies the research gaps. Section 3 describes the methodology employed to address the questions arising from these research gaps. Section 4 analyses the results and discusses what they mean. Section 5 concludes.

2.0 Literature Review and Research Gaps

The impact of foreign shareholdings in a country's banks may be informed by the agency and resource-based theories. Agency theory suggests that foreign shareholders may enhance a bank's internal governance by mitigating the bank's agency costs. Foreign shareholders help to reduce the risk that the banks may be manipulated by the controlling shareholders (Dharwadkar, George and Brandes, 2000). This role found empirical support from studies in the US (Kang and Kim, 2010) and China (Hassan and Xue, 2013, Lin and Zhang, 2009). In addition, Hasan and Xie (2013) further highlighted the improvement of corporate governance in the banks during the transition period of the domestic banks in China.

Next, the resource-based theory suggested by Douma, George and Kabir (2006) argues that foreign shareholders help to mitigate the impact of market imperfections by providing additional or superior resources such as finance, technology, branding, managerial know-how and expertise in international business (Dunning, 1988; Meyer et al. 2009). Foreign shareholdings may also provide other valuable resources such as integration into a foreign bank's global operations and business referrals. This helps enhance the domestic bank's performance, as evidenced by studies in Thailand (Wiwattanakantang, 2001), Hungary (Hasan and Marton, 2003), China (Fries and Taci, 2005; and Hou et al., 2013), and Kenya (Kiruri, 2013). Nevertheless, the contribution of the foreign shareholdings towards the firms' performances especially in banking is yet to yield conclusive results. Wu et al. (2007) found that the performances of the Chinese banks deteriorated with the inclusion of foreign shareholders. In addition, Wahyuni and Prabowo (2012) also found that foreign investors contribute to enhancing the performance of 158 listed firms in Jakarta Stock Exchange only if the foreign investors hold the largest or the second largest corporate shares in the firms. This is supported by the study of the listed firms in Vietnam by Phung and Le (2013).

These extensive studies notwithstanding, several research lacunae exist in relation to: (1) the impact of foreign shareholding concentration, (2) the relevance of foreign shareholders' countries of origin, (3) the foreign shareholders' contribution to in-country banks' performances, and (4) performance measures. First, the degree of shareholding has a bearing on foreign participation in decision-making and governance, often one of the objectives of foreign investment in host country banks. Having a significant share matters (Whitley and Kristensen, 1996; Gedajlovic, Yoshikawa and Hashimoto, 2004; Chhiber and Majumdar, 1999; and Wahyuni and Prabowo, 2012). For this reason, Gedajlovic et al. (2004) found no significant contribution of the foreign investors who had only minority interests in terms of financial performance and risk management of 247 largest Japanese firms.

Second, the foreign investor's country of origin is also important because the resource-based theory suggests that bank performance improves due to superior technology, financial capital

resources, management know-how and expertise. This assumes that the investors are from an advanced country with superior technology and systems. An investor from a country no more developed than the host country is unlikely to have such a salutary impact.

Third, studies of the relationship between foreign shareholding and bank performance in Asian developing countries are scant. Most existing studies compare the performances of the foreign banks with those of the domestic privately-owned or state-owned banks. Examples include Keshari and Paul (1994), Das, Nag and Ray (2005), Yao and Jiang (2007), Berger et al. (2009), Liao (2010), Ong, Theng and Teh (2011) and Chan and Karim (2011). But they do not compare the impact of foreign shareholding (be it in domestic or foreign banks) on these banks' performances.

Fourth, extant studies use traditional performance measures such as return on assets, return on equity and Tobin's Q (Chhibber and Majumdar, 1999); Douma et al. 2006; Wu et al. 2007; and Hasan and Xie, 2013). We argue that such measures may not fully reflect the banking sector's performance because financial ratios deal only with a bank's ability to maximize profit and create firm value. But in developing countries, banks are heavily regulated and are still the main channel for monetary policy transmission. Hence, efficiency analysis is also an important measure of bank performance because efficient resource allocation mobilises funds for economic and financial system development. Examining both cost efficiency and profit efficiency of the banks provides a more holistic view of their long-term performance. This is consistent with Douma et al., (2006) who combined three theories (agency, resource-based and institutional) to investigate the relationship between ownership structure and firm's performance in India, an emerging economy.

3.0 Methodology

3.1Translog Specification

This study adopts a parametric approach, Stochastic Frontier Analysis (SFA), to estimate the cost efficiency and profit efficiency of the public-listed commercial banks in ASEAN-5. SFA was first proposed by Aigner, Lovell and Schmidt (1977) and Meeusen and van den Broeck (1997) independently with modification of the traditional assumption of deterministic production frontier. Unlike the non-parametric approaches, SFA requires the specification of the production frontier based on an econometric approach where the component error is divided into two components. These components are the one-sided errors (which are used to account for the inefficiency of the decision-making units (DMUs)) and the error term due to random noise. The traditional cost and profit functions are presented in Equations (1) and (2) respectively.

$$lnTC_{it} = lnTC(y_{it}, w_{it}; \beta) + \varepsilon_{it} \quad (1)$$

$$ln\pi_{it} = ln\pi(y_{it}, w_{it}; \beta) + \varepsilon_{it} \quad (2)$$

where TC_{it} and π_{it} are the total costs and profit before tax of the i^{th} bank (i=1,2,…,N) at t^{th} year (t=1,2,…T); y_{it} are the output vectors of i^{th} bank at year t; w_{it} are the vectors for input prices of the i^{th} bank at year t; and β is the vector of the unknown coefficients for both output and input price variables in the cost and profit functions. Following Aigner et al.'s (1977) assumption, the error term of both cost and profit functions of the i^{th} bank can be written as

$$\varepsilon_{it} = u_{it} + v_{it} \tag{3}$$

where u_{it} is a non-negative random variable that captures the production inefficiency in relation to the frontier whereas v_{it} is the measurement error, statistical noise, and random shocks which cannot be controlled by the firms (Williams and Nguyen, 2005) and assumed to be independent and identically distributed with $N(0,\sigma^2)$.

Based on the cost and profit functions shown in Equations (1) and (2), we further specify the translog cost and profit equations as presented in Equation (4) below. The translog cost and profit functions based on the SFA are more flexible because they allow–for multiple output technology without violating curvature conditions (Guala, 2002). In addition, the translog function also avoids the drawbacks of both constant elasticity of substitution (CES) and Cobb-Douglas production functions which assume a monotonically increasing or decreasing average cost curve (Murray and White, 1983).

$$\ln TC_{it} = \alpha_0 + \sum_{i=1}^{3} \alpha_i \ln y_{it} + \frac{1}{2}\sum_{k=1}^{4}\sum_{j=1}^{4} \alpha_{ij} \ln y_{kit} \ln y_{jit} + \sum_{k=1}^{3} \beta_i \ln w_{kit} + \frac{1}{2}\sum_{k=1}^{3}\sum_{j=1}^{3} \beta_{ij} \ln w_{kit} \ln w_{jit}$$
$$+ \sum_{k=1}^{4}\sum_{j=1}^{3} \phi_{ij} \ln y_{kit} \ln w_{jit} + v_{it} + u_{it} \tag{4}$$

where:

TC_{it} = total cost including operating costs plus interest costs of bank i at time t $(t=1,2,...T)$

y_{kit} = outputs k $(k=1,2,3,4)$ of bank i at time t

w_{kit} = input prices for input factor k $(k=1,2,3)$ of bank i at time t

v_{it} = random error identically and independently distributed i.i.d. and $N(0,\sigma_v^2)$

u_{it} = non-negative random variables i.i.d with truncations at zero on $N(u,\sigma_u^2)$ distribution.

The standard symmetry of input prices and output vectors is imposed by setting $\alpha_{ij} = \alpha_{ji}$ and $\beta_{ij} = \beta_{ji}$. Next, restrictions for homogeneity of input prices are imposed by setting $\sum_{i=1}^{n} \beta_i = 1$, $\sum_{i=1}^{n} \beta_{ij} = 0$, and $\sum_{i=1}^{n} \phi_{ij} = 0$. The cost efficiency is defined as $\frac{u_{\min}}{u_i}$ where $u_{\min}$ is the inefficiency associated with the best practice banks and u_i is defined as the inefficiency of bank i. The inefficiency scores can be obtained from $\{E[\exp(u_{it})|\varepsilon_{kit}\}^{-1}$.

Profit before tax is employed in the estimation of profit functions as it closely represents the operating profit of banks. To avoid a negative profit, a constant is added into the profit model. In this context, the dependent variable for the profit function is defined as

$\ln(\pi + |\pi^{\min}| + 1)$ where $|\pi^{\min}|$ is the absolute value of minimum profits, Π. The profit efficiency is defined as $\frac{u_i}{u_{\max}}$ where $u_{\max}$ is defined as the inefficiency associated with the best practice banks and u_i is defined as the inefficiency of bank i. Hence, the sign of the inefficiency term is negative for profit efficiency and the profit efficiency scores can be calculated from $E[\exp(-u_{it})|\varepsilon_{it}]$.

This study employs both cost efficiency and profit efficiency measures to study the ability of the banks to minimize their cost of production and at the same time maximize their profit given the price of inputs and also financial outputs involved. A cost efficient bank is said to operate at the costs near the "best practice" or the least cost firm (Clark and Siems, 2002). Profit efficiency is used in conjunction with cost efficiency because together they yield a better bank efficiency measure that considers both the cost and revenue aspects. In the profit generation process, banks need to optimise profits by not only controlling their costs but also optimising revenue through appropriate pricing strategies. This study utilizes the concept of alternative profit because the ASEAN-5 banks have, to some extent, limited market power to price their services and products.

We further incorporate the percentage of foreign shareholding of the public-listed banks to examine its influence on both cost and profit efficiencies. In doing so, we employ the Battese and Coelli (1995) model that allows for simultaneous estimation of the stochastic cost and profit functions and the identification of the bank inefficiencies' correlates in a one-step estimation. This helps to solve the problem of identifying the inefficiencies (obtained from the residuals) which violate the i.i.d assumptions. Hence, under the one-step estimation, we further define the inefficiency of u_{it} as $u_{it} = z_{it}\delta + w_{it}$, where u_{it} follows a truncated-normal distribution with mean $z_{it}\delta$ and variance σ_u^2. w_{it} is a random variable and is assumed to be normally distributed with zero mean and variance σ^2, where the point of truncation is $-z_{it}\delta$ and hence, $w_{it} = -z_{it}\delta$. δ are the parameters to be estimated.

Following Battese and Coelli (1995), the cost and profit inefficiency effects are then further defined as a function of foreign shareholdings based on the countries of origin as specified in Equation (5):

$$u_{it} = \delta_0 + \delta_1 US_{it} + \delta_2 Euro_{it} + \delta_3 Dev_{it} + \delta_4 China_{it} + \delta_5 Developing_{it} + \delta_6 Size_{it} + \delta_7 ROA_{it} + \delta_8 CPI_{it} + \delta_9 GDPCAP_{it} + w_{it} \quad (5)$$

where each variable, for a given bank i at time t, refers to the following: US_{it}, $Euro_{it}$, Dev_{it}, $China_{it}$ and $Developing_{it}$ are the proportions of shares held by investors from the U.S., Europe, developed Asian countries, China and other developing countries respectively. Meanwhile, $Size_{it}$ is the natural logarithm of bank i's total assets, ROA_{it} is the return on assets, CPI_{it} is the natural logarithm of the consumer price index (base year=1995) in bank i's country, $GDPCAP_{it}$ is the natural logarithm of the real gross domestic product (base year =2005) per capita. Equation (5) can be estimated using the maximum likelihood method that caters for simultaneous estimation of the parameters of the stochastic frontier and the model for the inefficiency effects. The likelihood function is expressed in terms of the variance parameters where $\gamma = \frac{\sigma_u^2}{\sigma^2}$ and

$\sigma^2 = \sigma_u^2 + \sigma_v^2$. In this case, γ lies between zero and one. If the value of γ is positive, this means that the correlates are important in explaining the total variability in the bank's cost and profit functions.

3.2 Definition of Variables

Following Berger and Humphrey (1992), this study adopts the value-added approach to determine the input and output vectors, defined as follows. First, we use three input vectors of labor, physical capital and loanable funds. Loanable funds, in turn, comprise funds from deposits and short-term borrowings used to finance the output-generation process. The value-added approach treats deposits as an output vector because it views banks as providing transaction and safekeeping services (Dietsch and Lozano-Vivas, 2000). Second, we employ four output vectors, namely loans, other earning assets (mainly investments), deposits and off-balance sheet items. Third, total cost is the sum of total operating costs and total interest expenses. Finally, profit before tax is obtained directly from the banks' annual reports. All output vectors, total costs and profit before taxes values are in USD million. Table 1 summarises the definitions of the input and output variables.

Table 1: Input and Output variables

Variables		**Definitions**
Inputs:		
Labor	-	total personnel expenses
Physical capital	-	total fixed assets
Loanable funds	-	total deposits and short-term borrowings
Price of Inputs:		
Price of labor	-	total personnel expenses divided by total assets
Price of physical capital	-	depreciation expenses divided by fixed assets' gross book value
Price of loanable funds	-	total interest expenses divided by total loanable funds
Outputs:		
Loans	-	total net loans
Investments	-	other earning assets
Deposits	-	total deposits
Off-balance sheet activities	-	total off-balance sheet amount outstanding

We categorise the percentage of foreign shareholdings based on the ASEAN-5's major trading partners such as the U.S., the European countries, Asian developed countries (such as Japan and Hong Kong), China and other developing countries. We expect foreign shareholdings from countries with superior resources (technology, financial capital, management know-how and expertise) to help improve the bank's efficiency level. Shareholdings from a country no more developed than the host country is unlikely to enhance bank efficiency.

We further control for both bank-specific factors (size and profitability) and macroeconomic conditions which may influence the bank efficiency levels. We control for bank size measured by the natural logarithm of the individual banks' total assets because the efficiency level of the banks may increase from economies of scale when the bank size increase. The return on asset is

used to control for profitability because more profitable banks can perform better and allocate their resources more efficiently.

As for macroeconomic conditions, we control using the natural logarithm of real GDP per capita with 2005 as the base year. This is a measure of cyclical conditions of the macroeconomic environment and market maturity. A higher GDP per capita implies higher average individual income; hence, banks which can set higher prices may attain higher efficiency levels. In addition, higher average income also means higher cost of doing business and this may inevitably reduce the cost efficiency level of the banks. We also control for the country's inflationary experience because higher inflation rates may increase the prices of the input factors.

3.3 Sample and Data

The sample of this study consists of locally-owned listed commercial banks in ASEAN-5 (Indonesia, Malaysia, The Philippines, Singapore and Thailand) from years 2001 to 2012. The sample period is selected after the megamergers following the 1997 Asian Financial Crisis. This is crucial because the mergers signify the importance of the banking sectors' strength and also gradual liberalization of foreign ownership of these countries' commercial banks.

Our dataset covers 56 public-listed commercial banks in the ASEAN-5 from years 2001 to 2012 yielding a sample of 655 observations. This is an unbalanced panel because we try to maintain as many banks as possible in this study so as to obtain a better representation of how the foreign shareholdings affect the cost and profit efficiencies. In this study, we filter the banks to include only banks with at least 3 years data so as to obtain a smoother and better estimation of the cost and profit efficiencies. The number of observations for each country is presented in Table 2.

Table 2: Number of observations by country

Country	Number of observations	Percentage of observation
Indonesia	273	41.68
Malaysia	94	14.35
The Philippines	144	21.98
Singapore	36	5.50
Thailand	108	16.49
Total	655	100.00

Table 3 presents the summary statistics of the input and output variables employed in this study, together with the percentage of foreign shareholding according to the countries of origin. The average profit before tax is USD17.6 billion with Indonesia having the highest amount of USD41.7 billion, followed by Singapore (USD 1.7 billion).

Table 3: Descriptive statistics (in USD million unless otherwise stated)

Variable	Mean	Standard Deviation	Minimum	Maximum
Full Sample				
Profit before tax	17,623.44	313,055.74	-655.58	5,731,400.00
Operating cost	34,007.97	507,712.00	2.90	9,203,642.91

Investment	257,373.46	4,122,784.85	18.99	97,962,000.00
Off-balance sheet activities	44,909.05	598,897.76	0.00	11,907,600.00
Total loans	16,117.44	76,305.86	5.22	1,572,313.12
Total deposits	492,937.26	7,632,039.95	2.17	164,800,000.00
Price of labor	1.88	21.49	0.00	352.86
Price of capital	0.44	6.71	0.00	171.65
Price of funds	0.05	0.04	0.00	0.82
% of Foreign Shareholdings from:				
U.S.	3.03	6.55	0.00	44.59
Europe	4.08	10.56	0.00	98.96
Asian developed countries	8.55	23.72	0.00	99.00
China	0.00	0.02	0.00	0.36
Developing countries	2.70	14.36	0.00	139.10
Indonesia				
Profit before tax	41,713.11	484,398.20	-655.58	5,731,400.00
Operating cost	80,613.54	784,888.39	2.90	9,203,642.91
Investment	604,661.50	6,376,575.28	18.99	97,962,000.00
Off-balance sheet activities	94,022.34	926,167.79	0.00	11,907,600.00
Total loans	15,754.11	114,882.49	5.22	1,572,313.12
Total deposits	1,146,494.62	11,802,971.37	2.17	164,800,000.00
Price of labor	4.49	33.14	0.00	352.86
Price of capital	0.84	10.39	0.00	171.65
Price of funds	0.07	0.06	0.00	0.82
% of Foreign Shareholdings from:				
U.S.	1.62	4.77	0.00	44.48
Europe	3.57	13.30	0.00	98.96
Asian developed countries	14.33	34.27	0.00	99.00
China	0.00	0.03	0.00	0.36
Developing countries	5.63	21.64	0.00	139.10
Malaysia				
Profit before tax	443.42	490.75	-196.61	2,581.37
Operating cost	911.81	762.52	150.70	4,258.52
Investment	6,908.22	7,074.68	577.43	37,213.90
Off-balance sheet activities	9,680.13	9,361.74	930.64	53,426.30
Total loans	19,505.41	18,360.52	2,817.94	101,960.14
Total deposits	38,715.53	128,454.69	3,762.08	1,253,551.00
Price of labor	0.01	0.00	0.00	0.01

Price of capital	0.14	0.06	0.00	0.33
Price of funds	0.03	0.01	0.00	0.04
% of Foreign Shareholdings from:				
U.S.	1.93	2.72	0.00	12.19
Europe	2.63	6.87	0.00	61.76
Asian developed countries	4.27	10.77	0.00	48.45
China	0.00	0.03	0.00	0.27
Developing countries	1.23	5.06	0.00	25.00
The Philipines				
Profit before tax	186.30	1,322.85	-102.02	15,914.00
Operating cost	217.67	214.30	3.55	886.38
Investment	2,545.00	2,642.86	30.00	11,012.00
Off-balance sheet activities	692.23	1,155.71	0.65	5,728.84
Total loans	2,464.30	3,164.55	39.70	18,020.00
Total deposits	4,602.77	5,121.74	64.31	23,650.00
Price of labor	0.01	0.03	0.01	0.37
Price of capital	0.19	0.61	0.00	7.38
Price of funds	0.04	0.01	0.02	0.08
% of Foreign Shareholdings from:				
U.S.	1.40	2.41	0.00	10.57
Europe	3.23	8.72	0.00	49.30
Asian developed countries	3.18	8.22	0.00	41.14
China	0.00	0.00	0.00	0.00
Developing countries	0.55	2.60	0.00	16.13
Singapore				
Profit before tax	1,717.84	824.25	602.16	4,055.41
Operating cost	2,315.81	941.14	856.65	4,505.27
Investment	51,391.33	22,588.81	15,068.45	104,418.70
Off-balance sheet activities	41,355.83	32,175.71	1,595.57	128,208.40
Total loans	66,642.93	37,072.38	21,372.88	171,144.30
Total deposits	97,325.71	47,628.52	37,865.96	226,654.70
Price of labor	0.01	0.00	0.00	0.01
Price of capital	0.11	0.06	0.04	0.24
Price of funds	0.02	0.01	0.01	0.03
% of Foreign Shareholdings from:				

U.S.	2.66	3.81	0.00	11.57
Europe	3.41	3.70	0.00	10.97
Asian developed countries	0.35	0.73	0.00	3.43
China	0.00	0.00	0.00	0.00
Developing countries	0.78	1.34	0.00	7.26
Thailand				
Profit before tax	234.45	379.99	-285.76	1,671.05
Operating cost	623.12	497.12	28.85	2,126.36
Investment	5,935.99	5,657.45	101.71	25,442.62
Off-balance sheet activities	11,563.95	18,324.66	1.20	100,885.10
Total loans	15,449.43	12,724.35	577.07	49,517.59
Total deposits	19,213.79	15,916.89	485.54	64,305.98
Price of labor	0.01	0.00	0.00	0.02
Price of capital	0.11	0.09	0.03	0.45
Price of funds	0.03	0.01	0.01	0.06
% of Foreign Shareholdings from:				
U.S.	9.86	11.35	0.00	44.59
Europe	7.99	8.13	0.00	28.31
Asian developed countries	7.54	9.93	0.00	48.99
China	0.00	0.03	0.00	0.22
Developing countries	0.09	0.44	0.00	3.77

This table reports the summary statistics for the full sample and each individual country for the dataset. This includes the inputs vector, output vectors, price of inputs, total cost and total profit before taxes and also the percentage of foreign shareholding in the public-listed commercial banks in ASEAN-5 based on country of origin.

Table 3 also shows that the operating cost averages USD34 billion which is higher than the USD0.97 billion found in Sun and Chang's (2011) study of the emerging Asian countries for the years 1998 to 2008. This may be due to the higher proportional labour cost (and/or lower proportionate assets as output) and hence, higher proportional cost of operations relative to assets in the public-listed banks in Indonesia which averaged USD80.6 billion. In addition, we suspect that the differences in the statistics may be due to the relatively lower labour costs in India and China markets compared with ASEAN-5 (Sun and Chang, 2011). Overall, we found that the labor cost in ASEAN-5 is relatively higher with an average of USD1.88 per unit compared with the price of capital and price of funds with an average of USD0.44 per unit and USD0.05 per unit respectively. This is also consistent with the study reported by Sun and Chang (2011) where they also found that the price of funds were cheaper compared with the price of capital in the Asian emerging countries. The price of capital and price of funds in the region are also comparable with those of the Chinese banking industry as reported by Berger et al. (2009) with an average of USD1.19 per unit and USD0.06 per unit respectively.

In terms of output, the data in Table 3 suggests that commercial banks in Indonesia focus more on investments and off-balance sheet activities as compared with those in the other countries; Indonesian banks have average investment and off-balance sheet outstanding of USD604.7 billion and USD94.0 billion respectively. Nevertheless, the total loan size in Indonesia is relatively low with an average of USD15.8billion compared with countries like Malaysia, Singapore and Thailand. Such a situation may result in over-exposure to risks of the Indonesian banks as most of their assets are locked in investments rather than traditional banking activities such as loans.

The Philippines has the lowest amount of profit before tax, investment, off-balance sheet outstanding, loans and total deposits as shown in Table 3. In addition, it also yielded the lowest operating scale with assets of USD5.6 billion.

Foreign shareholding in the ASEAN-5 banks is low, averaging 18.36 percent with the largest number of foreign shareholdings originating from developed Asian countries such as Japan and Hong Kong with an average of 8.55percent. In-country comparisons suggest that the countries with the highest concentration of investors from developed Asian countries are Indonesia (14.33 percent) and Thailand (7.54 percent). The public-listed banks in Singapore are the least exposed to foreign shareholdings.

Besides the Asian developed countries, the major foreign shareholding concentrations came from the developed countries of the U.S and Europe, averaging 3.03 percent and 4.08 percent respectively. The U.S and European shareholding concentrations are highest in Thailand, averaging 9.86 percent and 7.99 percent respectively. This suggests that the Thai banking sector may be more open to foreign shareholdings compared with the other ASEAN-5 countries.

Table 4 presents the pairwise correlation of coefficient of the variables used in the estimation. It indicates that the regressors are free from multicollinearity as the coefficient correlations are less than 50 percent.

Table 4: Pairwise correlation matrix for variables

	Cost inefficiency	Profit inefficiency	US	EUROPE	DEVELOPED	CHINA	DEVELOPING	ROA	SIZE	CPI	GDPCAP
Cost inefficiency	1.000										
Profit inefficiency	0.003	1.000									
US	0.068*	0.168***	1.000								
EUROPE	0.107***	0.003	0.218***	1.000							
DEVELOPED	0.049	0.019	0.020	-0.013	1.000						
CHINA	0.013	0.077**	0.178***	0.000	0.172***	1.000					
DEVELOPING	-0.107***	-0.027	-0.020	-0.058	0.013	-0.019	1.000				
ROA	0.087**	-0.051	-0.031	-0.024	-0.024	-0.006	-0.012	1.000			
SIZE	-0.067*	0.466***	0.285***	0.071*	-0.030	0.099**	0.065*	-0.054	1.000		
CPI	0.015	0.054	0.136***	0.179***	0.099**	0.111***	0.215***	-0.078**	0.147***	1.000	
GDPCAP	-0.184***	0.323***	0.136***	0.033	-0.110	0.011	-0.053	-0.058	0.647***	0.028	1.000

COST=cost inefficiency scores, PROFIT = profit inefficiency scores, INV=natural logarithm of total investments, OBS= natural logarithm of total off-balance sheet activities, LOAN=natural logarithm of total loans, DEP=natural logarithm of total deposits and short-term funding, STAFF=price of labor, CAP=price of capital, INT=price of loanable funds, US= percentage of foreign shareholding from the US, EUROPE= percentage of foreign shareholding from the European countries, DEVELOPED= percentage of foreign shareholding from Asian developed countries, China= percentage of foreign shareholding from China, DEVELOPING= percentage of foreign shareholding from developing countries. Control variables are Siz) = natural logarithm of total assets, ROA= return on asset, CP)= natural logarithm of Consumer Price Index, GDPCAP= natural logarithm of real GDP/ capita. Standard error of coefficient is in parentheses.

** Denote significance at the 10% level.*

*** Significance at the 5% level.*

**** Significance at the 1% level.*

4.0 Results and Discussion

The cost efficiency and profit efficiency scores are estimated based on translog specifications using the Stochastic Frontier Approach (SFA) and are summarised in Table 5. Consistent with the literature from SFA estimation of cost and profit efficiency analysis, we found that the ASEAN-5 banking sectors are more cost efficient (93.35percent) than profit efficient (76.88 percent). The variation of the cost efficiency scores in this region is small (3.4 percent) compared with that for profit efficiency (11.3 percent).

The public-listed banks in Singapore are the most cost efficient (95.09 percent), followed by those in Malaysia and Indonesia. Nevertheless, the Singapore public-listed banks are the least profit efficient (only 64.39 percent) and the Indonesian-listed banks have the highest profit efficiency scores (80.77 percent). This may be due to the more intense competition in Singapore because of its status as an international financial hub. Hence, banks in Singapore may not able to exploit high economic rent and therefore, need to be more cost efficient in order to ensure long term survival.

Table 5: Summary of cost efficiency and profit efficiency scores

Cost Efficiency	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**
Full Sample	0.9335	0.0336	0.8862	0.9940
Malaysia	0.9456	0.0262	0.8862	0.9874
Singapore	0.9509	0.0286	0.8862	0.9900
The Philippines	0.9160	0.0312	0.8862	0.9940
Indonesia	0.9370	0.0341	0.8862	0.9916
Thailand	0.9317	0.0333	0.8862	0.9938
Profit Efficiency	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**
Full Sample	0.7688	0.1128	0.3430	0.9712
Malaysia	0.7699	0.0739	0.4695	0.8944
Singapore	0.6439	0.1027	0.3892	0.8462
The Philippines	0.7816	0.0865	0.3821	0.9712
Indonesia	0.8077	0.0817	0.3430	0.9324
Thailand	0.6941	0.1662	0.3430	0.9308

We present the estimation of the effect of foreign shareholding on cost inefficiency and profit inefficiency in Tables 7 [6] and 8 [7] respectively. The pooled ordinary least squares (OLS) estimates are presented as Model 1, the normal translog specification as Model (2) and Model (3) shows the Battese-Coelli (1995) estimation for the bank inefficiencies correlates.

Table 6: The effect of foreign shareholding on cost inefficiency

Variable	Model 1	Model 2	Model 3
Constant	0.312	0.555***	0.285*
	(0.193)	(0.155)	(0.152)
INV	-0.227***	-0.343***	-0.353***
	(0.047)	(0.033)	(0.031)
OBS	-0.006	0.038**	0.026
	(0.023)	(0.018)	(0.020)
LOAN	-0.001	-0.041	-0.090***
	(0.052)	(0.037)	(0.034)
DEP	1.288***	1.402***	1.472***
	(0.076)	(0.060)	(0.049)
STAFF	-0.002	-0.006	-0.099**
	(0.055)	(0.047)	(0.045)
CAP	0.154***	0.131***	0.110***
	(0.032)	(0.025)	(0.020)
INT	0.988***	1.227***	1.213***
	(0.067)	(0.050)	(0.045)
INV2	-0.005	-0.030***	-0.021***
	(0.09)	(0.007)	(0.005)
OBS2	0.000	0.001	0.001
	(0.01)	(0.001)	(0.001)
LOAN2	-0.019***	-0.029***	-0.025***
	(0.02)	(0.002)	(0.002)
DEP2	-0.095***	-0.185***	-0.168***
	(0.018)	(0.016)	(0.013)
STAFF2	-0.013***	-0.028***	-0.036***
	(0.004)	(0.003)	(0.002)
CAP2	0.012***	0.008***	0.006***
	(0.001)	(0.001)	(0.001)
INT2	0.038***	-0.016**	-0.016**
	(0.010)	(0.008)	(0.006)
INVOBS	0.004	0.003	0.000
	(0.004)	(0.003)	(0.003)
INVLOAN	-0.078***	-0.119***	-0.111***
	(0.011)	(0.011)	(0.009)
INVDEP	0.084***	0.188***	0.163***
	(0.024)	(0.021)	(0.015)
OBSLOAN	0.008**	0.009***	0.003
	(0.004)	(0.003)	(0.003)
OBSDEP	-0.013*	-0.015***	-0.005
	(0.007)	(0.005)	(0.006)
LOANDEP	0.111***	0.176***	0.161***
	(0.013)	(0.013)	(0.011)
STAFFCAP	0.032***	0.021***	0.018***
	(0.006)	(0.005)	(0.005)

	-0.003	0.070***	0.066***
STAFFINT	(0.012)	(0.009)	(0.008)
	-0.016**	0.005	0.002
CAPINT	(0.007)	(0.006)	(0.007)
	-0.079***	-0.118***	-0.113***
INVSTAFF	(0.008)	(0.007)	(0.006)
	0.040***	0.033***	0.031***
INVCAP	(0.007)	(0.005)	(0.005)
	0.004	0.083***	0.068***
INVINT	(0.015)	(0.013)	(0.011)
	0.001	0.008***	0.006***
OBSTAFF	(0.003)	(0.002)	(0.002)
	-0.011***	-0.004**	0.000
OBSCAP	(0.003)	(0.002)	(0.002)
	-0.001	-0.005	-0.004
OBSINT	(0.005)	(0.004)	(0.004)
	-0.026***	-0.039***	-0.035***
LOANSTAF	(0.007)	(0.005)	(0.005)
	0.026***	0.029***	0.028***
LOANCAP	(0.007)	(0.005)	(0.006)
	0.025*	0.057***	0.024**
LOANINT	(0.013)	(0.011)	(0.012)
	0.111***	0.162***	0.156***
DEPSTAFF	(0.014)	(0.011)	(0.010)
	-0.049***	-0.049***	-0.051***
DEPCAP	(0.008)	(0.008)	(0.008)
	-0.033	-0.151***	-0.109***
DEPINT	(0.022)	(0.019)	(0.017)
Correlates			
			-0.207**
Mu_0			(0.092)
			0.005
US			(0.011)
			-0.012
EURO			(0.009)
			-0.011*
DEV			(0.006)
			4.374***
CHINA			(1.619)
			0.020***
PING			(0.000)
			0.007***
SIZE			(0.047)
			-0.002**
ROA			(0.001)
CPI			-0.368***

			(0.118)
			0.367***
GDPCAP			(0.118)
		5.827***	6.989***
λ		(0.936)	(0.900)
		0.123***	0.265***
σ		(0.000)	(0.030)
R^2	0.998		
Adjusted R^2	0.998		
Log likelihood	778.166	825.680	936.071
σ_V^2		0.000	0.000
σ_u^2		0.015	0.061
σ_v		0.021	0.018
σ_u		0.121	0.247

The table provides the coefficients of cost frontier estimation based on stochastic frontier analysis for public-listed banks in ASEAN 5 over the period 2001-2012. The dependent variable is natural logarithm of total cost.. INV=natural logarithm of total investments, OBS= natural logarithm of total off-balance sheet activities, LOAN=natural logarithm of total loans, DEP=natural logarithm of total deposits and short-term funding, STAFF=price of labor, CAP=price of capital, INT=price of loanable funds, US= percentage of foreign shareholding from the US, EUROPE= percentage of foreign shareholding from the European countries, DEVELOPED= percentage of foreign shareholding from Asian developed countries, China= percentage of foreign shareholding from China, DEVELOPING= percentage of foreign shareholding from developing countries. Control variables are Siz) = natural logarithm of total assets, ROA= return on asset, CP)= natural logarithm of Consumer Price Index, GDPCAP= natural logarithm of real GDP/ capita. Standard error of coefficient is in parentheses.

** Denote significance at the 10% level.*

*** Significance at the 5% level.*

**** Significance at the 1% level.*

A review of Table 6 shows that estimates using different methods do not exhibit much variation both respect to the magnitude of the statistically significant variables as well as the level of significance. We thus discuss these estimates without reference to specific estimation methods.

The table shows that different levels of foreign shareholdings from the different countries affect cost inefficiencies. Therefore, this supports our argument that the country of origin matters in influencing banking efficiency because of the differences in terms of technology, financial capital resources, management know-how and expertise. Besides, such differences may also be due to different investment objectives of the foreign investors.

The results further suggest that the cost inefficiency level of the public-listed banks in this region depends mainly on the percentage of foreign shareholdings from the Asian developed countries, China and developing countries. This may be due to the greater similarities with ASEAN-5 in terms of culture, language and institutional backgrounds as suggested by Abdioglu, Khurshed and Stathopoulos (2013).

The findings suggest that a higher percentage of foreign shareholdings from the Asian developed countries helps to reduce the cost inefficiency and it is statistically significant at the 10 percent significance level. On the other hand, a higher percentage of foreign shareholdings from China and other developing countries worsens cost inefficiencies. This suggests that foreign shareholdings in developing countries' banks have positive spillover effects (Fries and Taci, 2005) because they help overcome market imperfection with better capital allocation, products

and managerial talents (Douma et al., 2006); and better technical and resource allocation efficiencies (Hao et al., 2013). The findings are also consistent with studies of the Chinese banking industry (Hasan and Xie, 2013; and Hou et al., 2013), transition countries (Hasan and Marton, 2003), and listed firms in ASEAN countries such as Thailand (Wiwattanakantang, 2001), Indonesia (Wahyuni and Prabowo, 2012) and Vietnam (Pung and Le, 2013).

The results further suggest that bank size is positively correlated with cost inefficiencies and it is statistically significant at the 1 percent level. This suggests that the banks exhibit decreasing returns to scale when bank size increases, consistent with the findings of Rao (2005) and William and Nguyen (2005). Consistent with the banking literature (Mester, 1993), the more profitable banks are better off in terms of efficiency in this region at the 5 percent significance level. The results are consistent with most of the studies in developing countries, such as by Allen and Rai (1996), Chang and Chiu (2006), Dacanay (2007) and Sufian (2009).

In terms of macroeconomic variables, we found that inflation helps to reduce cost inefficiencies. This suggests that banks are more price sensitive with an increase in consumer price index which makes them more cautious in cost control. On the other hand, higher GDP per capita worsens cost inefficiency. This may suggest that banks incur higher costs as a result of higher salary and capital expenses in line with economic growth. The result is consistent with the study by Sufian (2009) on the Malaysian banks.

Table 7: The effect of foreign shareholding on profit inefficiency

Variable	Model 1	Model 2	Model 3
Constant			
	7.041***	7.927***	6.448***
INV	(0.864)	(0.776)	(1.292)
	-0.509**	-0.555***	-0.387
OBS	(0.209)	(0.178)	(0.334)
	0.118	0.074	-0.105
LOAN	(0.102)	(0.089)	(0.129)
	0.661***	0.612***	0.529***
DEP	(0.230)	(0.200)	(0.274)
	-0.536	-0.590**	-0.463
STAFF	(0.341)	(0.290)	(0.457)
	-0.051	-0.014	-0.377
CAP	(0.247)	(0.225)	(0.332)
	-0.315**	-0.305**	-0.205
INT	(0.141)	(0.119)	(0.255)
	0.376	0.400	-0.037
INV2	(0.298)	(0.281)	(0.397)
	-0.039	-0.032	-0.015
OBS2	(0.039)	(0.032)	(0.055)
	-0.001	0.000	-0.004
LOAN2	(0.004)	(0.003)	(0.004)
	0.010	-0.005	0.018
DEP2	(0.010)	(0.009)	(0.018)

STAFF2	-0.033	-0.041	0.012
	(0.079)	(0.066)	(0.099)
CAP2	0.040**	0.047***	0.030*
	(0.016)	(0.015)	(0.017)
INT2	0.012**	0.002	0.008
	(0.005)	(0.004)	(0.009)
INVOBS	0.025	0.015	0.008
	(0.045)	(0.037)	(0.067)
INVLOAN	0.028	0.001	-0.012
	(0.018)	(0.015)	(0.025)
INVDEP	0.057	0.072	0.104*
	(0.051)	(0.044)	(0.061)
OBSLOAN	0.077	0.075	0.013
	(0.107)	(0.088)	(0.137)
OBSDEP	-0.009	0.007	-0.035
	(0.016)	(0.014)	(0.024)
LOANDEP	-0.027	-0.014	0.050
	(0.030)	(0.026)	(0.043)
STAFFCAP	0.003	0.010	-0.061
	(0.059)	(0.053)	(0.072)
STAFFINT	-0.052**	-0.047**	-0.026
	(0.026)	(0.022)	(0.035)
CAPINT	0.091*	0.067	0.005
	(0.052)	(0.053)	(0.065)
INVSTAFF	0.002	-0.012	-0.019
	(0.031)	(0.026)	(0.048)
INVCAP	0.053	0.034	0.057
	(0.037)	(0.033)	(0.048)
INVINT	0.034	0.023	0.054
	(0.031)	(0.025)	(0.051)
OBSTAFF	-0.046	-0.050	-0.059
	(0.065)	(0.055)	(0.098)
OBSCAP	-0.003	0.012	-0.028*
	(0.014)	(0.012)	(0.017)
OBSINT	-0.020*	-0.013	-0.012
	(0.012)	(0.010)	(0.019)
LOANSTAF	0.028	0.013	0.025
	(0.024)	(0.020)	(0.028)
LOANCAP	0.183***	0.171***	0.173***
	(0.033)	(0.029)	(0.040)
LOANINT	0.077***	0.069***	0.057
	(0.030)	(0.024)	(0.037)
DEPSTAFF	0.082	0.052	-0.014
	(0.060)	(0.055)	(0.076)
DEPCAP	-0.147**	-0.125**	-0.117
	(0.064)	(0.057)	(0.071)

DEPINT	-0.067* (0.038)	-0.067** (0.030)	-0.084 (0.070)
Correlates			
Mu_0			-0.256 (0.791)
US			0.052 (0.035)
EURO			0.043 (0.027)
DEV			0.021 (0.014)
CHINA			-0.454 (7.512)
PING			0.023 (0.015)
SIZE			-0.066 (0.278)
ROA			-0.001 (0.006)
CPI			0.083 (0.767)
GDPCAP			-0.082 (0.765)
λ		2.003*** (0.192)	5.473** (2.188)
σ		0.454*** (0.001)	1.103** (0.436)
R^2	0.770		
Adjusted R^2	0.756		
Log likelihood	-202.591	-209.491	-119.993
σ_V^2		0.041	0.038
σ_u^2		0.165	0.197
σ_v		0.203	0.196
σ_u		0.406	0.444

The table provides the coefficients of profit frontier estimation based on stochastic frontier analysis for public-listed banks in ASEAN 5 over the period 2001-2012. The dependent variable is the natural logarithm of total cost.. INV=natural logarithm of total investments, OBS= natural logarithm of total off-balance sheet activities, LOAN=natural logarithm of total loans, DEP=natural logarithm of total deposits and short-term funding, STAFF=price of labor, CAP=price of capital, INT=price of loanable funds, US= percentage of foreign shareholding from the US, EUROPE= percentage of foreign shareholding from the European countries, DEVELOPED= percentage of foreign shareholding from Asian developed countries, China= percentage of foreign shareholding from China, DEVELOPING= percentage of foreign shareholding from developing countries. Control variables are Siz) = natural logarithm of total assets, ROA= return on asset, CP)= natural logarithm of Consumer Price Index, GDPCAP= natural logarithm of real GDP/ capita. Standard error of coefficient is in parentheses.

** Denote significance at the 10% level.*

*** Significance at the 5% level.*

**** Significance at the 1% level.*

Table 7 shows that the percentage of foreign shareholdings failed to influence the profit inefficiency level of the banking institutions in the ASEAN-5. This may be due to the highly regulated banking sectors in the region where the governments control the banks in terms of price setting for their loans and deposits and hence, banks may not be able to exploit their market power to earn higher economic rent in this region.

The diagnostic checking based on LR test is conducted to determine the appropriateness of the cost and profit frontier functions as well as the suitability of the Battese and Coelli (1995) model. The results are presented in Table 8.

Table 8: Tests of hypothesis for parameters of the inefficiency cost and profit frontier model

Null Hypothesis	Log(Likelihood)	Test-Statistics	Decision
Cost frontier			
$H_0: \gamma = 0$	95.028***	5.991	Reject H_0
$H_0: \delta_1 = \cdots = \delta_{9=}0$	218.785***	18.307	Reject H_0
$H_0: \gamma = \delta_0 = \cdots = \delta_{9=}0$	315.810***	21.026	Reject H_0
Profit frontier			
$H_0: \gamma = 0$	-13.800***	5.991	Reject H_0
$H_0: \gamma = \delta_0 = \cdots = \delta_{9=}0$	165.196***	21.026	Reject H_0
$H_0: \delta_1 = \cdots = \delta_{9=}0$	178.996***	18.307	Reject H_0

** Denote significance at the 10% level.*
*** Significance at the 5% level.*
**** Significance at the 1% level.*

The first null hypothesis of $H_0 : \gamma = 0$ is rejected at the 1 percent significance level for all the samples indicating that the inefficiency effects are stochastic in nature. The second hypothesis of $H_0 : \gamma = \delta_0 = \delta_1 = ... = \delta_9 = 0$ is used to test for the existence of an inefficiency effect in the model. The null hypothesis is rejected at the 1 percent significance level for all the samples indicating that the inefficiency effects are appropriate. The third null hypothesis of $H_0 : \delta_1 = ... = \delta_9 = 0$ is used to test for the appropriateness of the Battese and Coelli (1995) model against the normal translog model. The result shows that the explanatory variables used in this model are significant in explaining the inefficiency effects in the model suggesting that the Battese and Coelli (1995) model is appropriate. Hence, the diagnostic checking indicates the appropriateness of the SFA model and the use of Battese and Coelli (1995) model to estimate the efficiency scores.

5.0 Conclusion

This paper analyses how foreign shareholdings affect the ASEAN-5 banking sector performance and presents three findings. First, foreign shareholding concentration affects bank efficiencies positively. Second, the foreign shareholders' countries of origin matter, but Asian countries had the greatest impact, perhaps a reflection of proximity and familiarity. In sum, foreign shareholdings have contributed positively to bank efficiency by reducing agency costs and enhancing the bank's resource base. Third, excessive regulation worsens banks' profit efficiency.

Besides these three findings, this paper also contributes to theory by considering the implications of foreign shareholdings on a bank's internal governance and hence, reducing agency costs.

Unlike most extant studies which compared the performance of local and foreign banks, this study assessed how foreign shareholdings of banks in a given country affect its banking sector's performance. It also evaluates the resource-based approach to differentiate the impact of the different origins of the foreign shareholdings. This paper's findings also present public policy implications because foreign shareholdings especially those from the more developed countries contribute positively to bank performance.

References

Abdioglu,N., Khurshed, A, and Stathopoulos, K. (2013). Foreign institutional investment: Is governance quality at home important? *Journal of International Money and Finance*, 32, 916-940.

Aigner, D., Lovell, C., and Schmidt, P. (1977). Formulation and estimation of stochastic frontier production function models. *Journal of Economics*, 6, 21-37.

Allen, L., and Rai, A. (1996). Operational efficiency in banking: An international comparison. *Journal of Banking & Finance*, 20, 655-672.

Battese, G.E., and Coelli, T.J. (1995). A model for technical inefficiency effects in a stochastic frontier production function for panel data. *Empirical Economics*, 20, 325-332.

Berger, A.N., and Humphrey, D. (1992). Measurement and efficiency issues in commercial banking. In Z. Griliches (Ed.), *Z. Griliches Studies in Income and Wealth: Output Measurement in the Service Sectors*. Chicago: University of Chicago Press.

Berger, A.N., Hasan, I., and Zhou, M. (2009). Bank ownership and efficiency in China: What will happen in the world's largest nation? *Journal of Banking & Finance*, 33, 113-130.

Bloomberg News. (2014). Vietnam raises foreign bank ownership caps to aid system. Bloomberg.

Chan, S.G., and Karim, M.Z.A. (2011). Efficiency of foreign banks: Evidence from selected (Association of Southeast Asian Nations) ASEAN countries. *African Journal of Business Management*, 5(14), 5617-5626.

Chang, T.C., and Chiu, Y.H. (2006). Affecting factors on risk-adjusted efficiency in Taiwan's banking industry. *Contemporary Economic Policy*, 24(4), 634-648.

Chhiber, P.K., and Majumdar, S.K. Foreign ownership and profitability: Property rights, control and the performance of firms in Indian industry. *Journal of Law and Economics*, 42, 209-238.

Clark, J.A., and Siems, T.F. (2002). X-efficiency in the banking: Looking beyond the balance sheet. *Journal of Money, Credit and Banking*, 34, 987-1013.

Dacanay, S.J. (2007). Profit and cost efficiency of Philippine commercial banks under periods of liberalization, crisis and consolidation. *The Business Review*, 7(2), 315-322.

Das, A., Nag, A., and Ray, S.C. (2005). Liberalisation, ownership and efficiency in Indian banking: A nonparametric analysis. *Economic and Political Weekly*, 40(12), 1190-1197.

Dharwadkar, R., George, G., and Brandes, P. (2000). Privatization in emerging economies: An agency theory perspective. *The Academy of Management Review*, 25(3), 650-669.

Dietsch, M., and Lozano-Vivas, A. (2000). How the environment determines banking efficiency: A comparison between French and Spanish industries. *Journal of Banking & Finance*, 24, 985-1004.

Douma, S., George, R., and Kabir R. (2006). Foreign and domestic ownership, business groups and firm performance: Evidence from a large emerging market. *Strategic Management Journal*, 27, 637-657.

Dunning, J.H. (1988). The electric paradigm of international production: A restatement and some possible extensions. *Journal of International Business Studies*, 19, 1-31.

Fries, S., and Taci, A. (2005). Cost efficiency of banks in transition: Evidence from 289 banks in 15 post-communist countries. *Journal of Banking & Finance*, 29, 55-81.

Gedajlovic, E., Yoshikawa, T., and Hashimoto, M. (2004). Ownership structure, investment behavior and firm performance in Japanese manufacturing industries. *Organization Studies*, 25(8), 1363-1392.

Guala, F.A. (2002). Measuring economies of scale and scope for the Argentine bank industry: A comparative analysis, 1996-1999. *UIUC Department of Economics Working Paper*.

Hasan, I., and Marton, K. (2003). Development and efficiency of the banking sector in a transitional economy. *Journal of Banking & Finance*, 27, 2249-2271.

Hasan, I., and Xie, R. (2013). Foreign bank entry and bank corporate governance in China. *Emerging Markets Finance & Trade*, 49(2), 4-18.

Hou, X., Chang, K., Wang, Q., and Li, C. (2013). State ownership, foreign minority shareholders, and the efficiency of Chinese commercial banks. *Emerging Markets Finance & Trade*, 49 (2), 70-90.

Kang, J.K., and Kim, J.M. (2010). Do foreign investors exhibit a corporate governance disadvantage? An information asymmetry perspective. *Journal of International Business Studies*, 41, 1415-1438.

Keshari, P.K., and Paul, M.T. (1994). Relative efficiency of foreign and domestic banks in India. *Economic and Political Weekly*, 29(9). M31-36.

Kiruri, R.M. (2013). The effects of ownership structure on bank profitability in Kenya. *European Journal of Management Sciences and Economics*, 1(2), 116-127.

Li, Y. (2013). Motivation of foreign strategic investment in China's banking sector: The eclectic paradigm. *The Journal of International Management Studies*, 8, 207-219.

Lin, X., and Zhang, Y. (2009). Bank ownership reform and bank performance in China. *Journal of Banking & Finance*, 33, 20-29.

Meeusen, W., and van den Broeck, J. (1997). Efficiency estimation from Cobb-Douglas production functions with composed error. *International Economic Review*, 18. 435-444.

Mester, L. (1993). Efficiency in the savings and loan industry. *Journal of Banking & Finance*, 17, 267-286.

Meyer, K.E., Estrin, S., Bhaumik, S.K., and Peng, M.W. (2009). Institutions, resources and entry strategies in emerging economies. *Strategic Management Journal*, 30, 61-80.

Murray, J.D., and White, R.W. (1983). Economies of scale and economies of scope in multi product financial institutions: A study of British Columbia credit unions. *Journal of Finance*, 38, 887-902.

Ong, T.S., Theng, L.Y., and Teh, B. H. (2011). A comparison efficiency of domestic and foreign banks in Malaysia: A DEA approach. *Business Management Dynamics*, 1(4), 33-49.

Phung, D.N., and Le, T.P.V. (2013). Foreign ownership, capital structure and firm performance: Empirical evidence from Vietnamese listed firms. *The IUP Journal of Corporate Governance*, 12(2), 40-58.

Rao, A. (2005). Cost frontier efficiency and risk-return analysis. *International Review of Financial Analysis*, 14, 283-303.

Sufian, F. (2009). Determinants of bank efficiency during unstable macroeconomic environment: Empirical evidence from Malaysia. *Research in International Business and Finance*, 23, 54-77.

Sun, L., and Chang, T.P. (2011). A comprehensive analysis of the effects of risk measures on bank efficiency: Evidence from emerging Asian countries. *Journal of Banking & Finance*, 35, 1727-1735.

Wahyuni, S., and Prabowo, M.A. (2012). Corporate control and firm performance: Does the type of owners matter? *Interdisciplinary Journal of Research in Business*, 2(3), 23-33.

Whitley, R., and Kristensen, P. (1996). *The Changing European Firm: Limits to Convergence*. London: Routledge.

Williams, J., and Nguyen, N. (2005). Financial liberalization, crisis, and restructuring: A comparative study of bank performance and bank governance in South East Asia. *Journal of Banking & Finance*, 29, 2119-2154.

Wiwattanakantang, Y. (2001). Controlling shareholders and corporate value: Evidence from Thailand. *Pacific-Basin Finance Journal*, 9, 323-362.

Wu, H.L., Chen, C.H., and Lin, M.H. (2007). The effect of foreign bank entry on the operational performance of commercial banks in the Chinese transitional economy. *Post-Communist Economies*, 19(3), 343-357.